

REMARKS

Applicant respectfully requests that the foregoing amendments be made prior to examination of the present application.

In the Specification, a Substitute Specification under 37 C.F.R. § 1.125 has been provided to replace the originally filed specification for clarity. No new matter has been added.

Claims 1-3 are requested to be cancelled without prejudice to further the prosecution on the merits.

Claims 4-11 are being added to provide claims of varying scope .

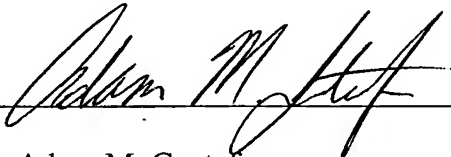
After amending the claims as set forth above, Claims 4-11 are now pending in this application.

Applicant believes that the present application is now in condition for allowance. Favorable consideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

Respectfully submitted,

Date 9/29/04

By 

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MARKED UP VERSION OF SUBSTITUTE SPECIFICATION**DESCRIPTION**

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~~SEAT FOR VEHICLE~~ SEAT**CROSS-REFERENCE TO RELATED PATENT APPLICATIONS**

The present Application claims the benefit of priority to the following international Applications: PCT Patent Application No. PCT/JP2003/003726 titled "Seat for Vehicle" filed on March 26, 2003 which published under PCT Article 21(2) on October 9, 2003 as WO 03/082624 A1 in the Japanese language and Japanese Patent Application No. 2002-94619 filed on March 29, 2002 (which are hereby incorporated herein by reference in their entirety).

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TECHNICAL FIELD

The present invention relates to a seat for a vehicle such as an automobile, a ship, an airplane or a railroad coach, and, more specifically, to a seat for a vehicle making it easy for an occupant to move within the vehicle.

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BACKGROUND ART

A vehicle, such as the aforementioned an automobile, is generally provided with relatively large seats with regard in comparison to the spatial dimensions of the interior thereof so as to provide laid-back seating for occupants. Therefore it is often uneasy for the occupants to move within the vehicle.

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Japanese Patent Application Laid-open No. 61-205524, Japanese Utility Model Laid-open No. 63-191942 and 62-84536 disclose arts related to a vehicle seat provided with a foldable seatback and a slidable seat cushion, what is called "a walk-in mechanism". These arts make a seat capable of folding the seatback and sliding movement of the whole of the seat.

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DISCLOSURE OF INVENTION

However, the aforementioned a conventional vehicle seat provided with the disclosed walk-in mechanism slides with the seat while holding the seat cushion in a substantially horizontal position so that thereby limiting the sliding distance of the seat in an fore-aft antero-posterior direction is limited. Therefore the conventional vehicle seat even equipped with the walk-in mechanism cannot make it sufficiently easy for occupants to move within the vehicle.

SUMMARY

The present invention is done in view of the above problem and is intended for providing a seat for a vehicle, which is capable of tilting a seatback forward as well as tipping a seat cushion up and hence enables longer sliding of the seat so as to ensure a space for making it easy for occupants to move within the vehicle, with an easy-operability of such operations.

According to one embodiment of the present invention, a seat for a vehicle according to the present invention is provided with includes a sliding device including having a slide-lock mechanism. The sliding device is configured to move (e.g., slide) sliding a seat body in a case of upon releasing the slide-lock mechanism, a seatback including a reclining device, the seatback being tilted forward in a case of releasing the reclining device, a seat cushion including a tip-up device, the seat cushion being tipped up in a case of operating the tip-up device and a walk-in mechanism including a lever, the walk-in mechanism configured to release the slide-lock mechanism, release the reclining device and operate the tip-up device in proportion to a shifting length of the lever.

The tip-up device is operated in a case where the lever is shifted in an intermediate position and the slide-lock mechanism and the reclining device are released in a case where the lever is shifted in an end position.

A shift of the lever alone enables tipping-up the seat cushion, reclining the seatback and sliding the seat. The seat for a vehicle according to the present invention can be slid in a larger distance than the seats according to the prior arts because the seat cushion moves accompanying with tipping-up thereof. Such a movement as well as reclining the seatback make it easy for an occupant to

move within the vehicle.

BRIEF DESCRIPTION OF DRAWINGS

Fig. 1 is a perspective view of a seat apparatus according to an embodiment of the present invention;

Fig. 2 is a side view of the seat apparatus according to the embodiment of the present invention;

Fig. 3 is a side view of a lifter device of the seat apparatus according to the embodiment of the present invention;

Fig. 4 is a side view of the seat apparatus according to the embodiment of the present invention, specifically showing a tip-up device and a walk-in mechanism; and

Fig. 5 is a perspective view of a reclining device of the seat apparatus according to the embodiment of the present invention.

~~BEST MODE FOR CARRYING OUT THE INVENTION~~

DETAILED DESCRIPTION

A seat for a vehicle, in which a shift of a lever alone enables tipping-up of a seat cushion, reclining of a seatback and sliding the seat, is provided. The seat can be slid in a greater and larger distance because the seat cushion moves accompanying with tipping-up thereof. Such a movement, as well as reclining the seatback, makes it easy for an occupant to move within the vehicle.

A seat apparatus 1 according to an embodiment of the present invention will be described hereinafter with reference to Figs. 1 through 5. ~~In these drawings~~ With reference to Figures 1 through 4, FR denotes "forward", RR denotes "rearward", UP denotes "upward" and LWR denotes "downward". These directions are defined for convenience of an explanation and any embodiments opposed to such a definition can be arbitrarily embodied are intended to be within the scope of the present invention.

The seat apparatus 1 ~~composes~~ comprises a basic framework of a seat for a vehicle and, as shown in Figs. 1 and 2, is generally provided with a pair of slide devices 2, a pair of support frames 3, a seat cushion portion 4, a seatback portion 5, a reclining device 6, a tip-up device 7, a lifter device 8, and a walk-in mechanism 9. The seat apparatus 1 ~~is combined with some elements~~ may include

additional features such as a headrest, a seat belt and a seat cover ~~so as to form to provide~~ a seat for a vehicle, however, such ~~elements~~ features are not shown in the ~~drawings~~ Figs. The slide devices 2 are ~~combined with~~ configured to be coupled to a body
 5 of the vehicle (not shown) ~~and then in use.~~

The slide devices 2 ~~is~~ are provided with fixed rails 13 each having a slit on an upper side thereof, sliding rails 14, each of which is formed to have an inverted T-letter shape and configured to slidably fitted into (e.g., engage) the slit, a slide-lock
 10 mechanism 15 for ~~stopping~~ securing the sliding rails 14 in a ~~proper~~ desired position, and coil springs 16 which are respectively stretched between the fixed rails 13 and the sliding rails 14 so as to give force to (e.g., bias) the sliding rails 14 in a forward direction. Furthermore, though not shown in the ~~drawings~~ Figures,
 15 rollers and/or ball bearings for facilitating the relatively smoothly sliding of the sliding rails 14 on the fixed rails 13 are further provided. The slide devices 2 are provided at both sides of the seat in a symmetrical manner and ~~fixed~~ coupled to a floor 10 (see Fig. 2) of a vehicle body by first brackets 11
 20 ~~respectively~~ provided at a front thereof of the slide devices 2 and second brackets 12 ~~respectively~~ provided at a rear thereof of the slide devices 2.

The support frames 3 are comprised of a pair of frame bodies 21 made of steel sheets formed in a substantially right triangular
 25 shape and respectively provided with oval openings 22. The paired frame bodies 21 are respectively fixed on the pair of fixed rails 14 in a manner that a base of the right triangle is directed downward, a side orthogonal to the base is vertically directed and a remaining hypotenuse is directed forward. The oval openings 22 are formed
 30 in an oval shape directed obliquely upward and forward so as to allow movement of a third shaft portion 27 described later.

As shown in Fig. 3, the lifter device 8 is provided with a first shaft portion 23, a second shaft portion 24, which are projectingly provided on inner sides of the paired frame bodies
 35 21, a gear 25 pivotally supported by the first shaft portion 23 and a sector gear 26 pivotally supported by the second shaft portion 24. The sector gear 26 has gear teeth 26a formed on the front

side thereof, which engage with the gear 25 pivotally supported in front of the sector gear 26. The oval openings 22 are formed so that the major axes thereof substantially correspond with an arc around the first shaft portion 24. The gear 25 is capable of rotating by means of operation means 30. When lifting the operation means 30 upward, rotation of the gear 25 lets the sector gear 26 swing downward and a front end portion 31b of a cushion frame 31 swing upward. When reversely operating the operation means 30, the front end portion 31b swings downward.

As shown in Fig. 1, the seat cushion portion 4 is provided with a closed-loop-like cushion frame 31, a plurality of brackets 35 ~~plurally~~ formed on the cushion frame 31 and a plurality of S-shape springs 32 respectively stretched in an ~~antero-posterior~~ fore-aft direction via the ~~plural~~ plurality of brackets 35. The seat cushion portion 4 is covered with a pad and a cover, ~~which are not shown in the drawings,~~ (not shown) so as to form provide a seat cushion. A rear end portion 31a of the cushion frame 31 is fixed coupled to the third shaft portion 27. The cushion frame 31 is further provided with brackets 34 and absorbers 33 made of any suitable material having viscoelastically such as rubber. and The absorbers 33 are laid on a peripheral surface of an upper side of the second shaft portion 24 with having the brackets 34 and the absorbers 33 therebetween between the second shaft portion 24 and the brackets 34. The absorbers 33 reduce noise which may be generated when the cushion frame 31 hits the second shaft portion 24.

The second shaft portion 24 of the sector gear 26 is provided with a fixed shaft 28 fixed coupled to the frame bodies 21 and rotation shafts 29 rotatably and pivotally supported by the fixed shaft 28. The fixed shaft 28 and the rotation shafts 29 are lubricated with a proper lubricant such as grease. The fixed shaft 28 is provided with retaining means, such as conically expanded both ends thereof, so as to prevent the rotation shafts 29 from displacement.

The seatback portion 5 is provided with a seatback frame 41, sub-frames 42, upper end portions 42b of which are welded and fixed with rear sides of lower end portions 41a of the seatback frame 41, and a plurality of wires 43 laid between both sides of

the seatback frame 41. The seatback portion 5 is covered with a pad and a cover, which are not shown in the drawings, so as to form a seatback. The lower end portion 41a of the seatback frame 41 and lower end portion 42a of the sub-frame 42 ~~is~~ are separated
 5 to ~~have provide~~ provide a space in an ~~antero-posterior~~ fore-aft direction. ~~and~~ According to one embodiment, the reclining device 6 ~~falls is~~ is provided within the space defined by lower end portions 41a and 42a. The seatback portion 5 is provided with a plurality of holders 45 on an upper end thereof so as to support a headrest (not shown).

10 The reclining device 6 is provided with covers 51 for respectively covering the lower end portions 41a and the lower end portions 42a of the sub-frames 42, support members 52, base plates 53 supported on the upper end of the frame bodies 21, springs 54 for constantly pressing (e.g., biasing) the seatback portion
 15 5 forward and a device lever 55 for releasing a lock of the reclining device 6. When releasing the lock of the reclining device 6, the seatback portion 5 tilts forward by the pressing force of the springs 54. The lower end portions 41a of the seatback frame 41 are welded with front end portions of the covers 51 and the lower end portions
 20 42a of the sub-frames 42 are welded with rear end portions of the covers 51, thereby the seatback frame 41 is ~~fixed with~~ coupled to the covers 51.

As shown in Fig. 4, the tip-up device 7 is provided with restriction portions 61, arms 63 extendeding reward from the third
 25 shaft portion 27, and fifth shaft portions 65 projectingly provided in front of the third shaft portion 27. The tip-up device 7 is fitted into the third shaft portion 27 so as to be exterior to the frame bodies 21. The restriction portion 61 is further provided with a through-hole 62 formed in a shape like an arc, which has
 30 a center on the third shaft portion 27. Each arm 63 is further provided with a fourth shaft portion 64 projectingly provided on an outer surface thereof and the fourth shaft portion 64 is movably fitted in the through-hole 62. Between the fourth shaft portions 64 and the fifth shaft portions 65, coil springs 66 are respectively
 35 laid and stretched. The fourth shaft portions 64 rotate around the third shaft portion 27 and the springs 66 are laid at the fifth shaft portions 65 disposed ahead of the third shaft portion 27,

thereby the springs 66 ~~give force to~~ bias the fourth shaft portions 64 toward an upper end or a lower end of the through-hole 62. Therefore the vicinity of the center of the through-hole 62 is a dead point where the force by the springs 66 is lost and unstable.

5 As shown in Figs. 2 and 4, the walk-in mechanism 9 is provided with a pedal lever 71, a slide-release link 74 cooperatively working with the pedal lever 71 and a slide-release plate 72. The pedal lever 71 ~~is extended~~ is extended from the third shaft portion 27 of the cushion frame 31 to a lower side of the seat apparatus 1 and has a pivot
10 pin 71a at a middle thereof. The slide-release link 74 is formed in a substantially linear shape, a front end thereof is a fork end 74b having a cut 75 and a rear end 74a is rotatably and pivotally supported by the pivot pin 71a. The slide-release plate 72 is a flat plate having a first wing 72a and a second wing 72b and
15 being formed in a boomerang-like shape. The slide-release plate 72 is rotatably and pivotally supported by the frame bodies 21 with a sixth shaft portion 73. A pin 76 is projectingly formed on a tip end of the first wing 72a and slidably fitted to the cut 75. A proper clearance exists between a rear end 81 of the cut
20 75 and the pin 76. Slide-lock-release wires 78 and 77 are respectively connected to the first wing 72a and the second wing 72b. A reclining-release wire 79 linking with the reclining device 6 is connected to a middle of the pedal lever 71. A spring 80 constantly ~~presses~~ biases the slide-release plate 72 rearward.

25 The walk-in mechanism 9 regulates operation of the slide-lock device 15, the reclining device 6 and the tip-up device 7 in proportion to a shifting length of the pedal lever 71. When shifting the pedal lever 71 down, the cushion frame 31 swings upward around the third shaft portion 27. When further shifting the pedal lever
30 71 down in an intermediate position thereof, the fourth shaft portions 64 swing upward over the dead point and is hence given downward force by the springs 66, thereby the cushion frame 31 leaps up (tips up). Simultaneously, the rear end 74b of the slide-release link 74 is pressed downward and forward by the pedal
35 lever 71, however, the pin 76 keeps still because the proper clearance exists between the rear end 81 and the pin 76. Meanwhile, when pressing the cushion frame 31 downward so that the fourth

shaft portions 64 go over the dead point, the cushion frame 31 easily returns to its original position by means of the force by the springs 66.

When shifting the pedal lever 71 down in an end position thereof, the rear end 81 abuts and presses the pin 76 forward. Thereby the slide-release plate 72 swings around the sixth shaft portion 73 and the slide-release wires 77 and 78 are pulled so that the slide-lock mechanism 15 is released. Provided that the slide-lock mechanism 15 is released, the sliding rails 14 move forward by means of the force by the spring 16. Simultaneously, the reclining-release wire 79 is pulled downward so that the reclining device 6 is released, thereby the seatback portion 5 can be tilted forward.

Namely, when shifting the pedal lever 71 downward to a considerable extent, tipping-up of the seat cushion portion 4, tilting of the seatback portion 5 and moving forward of the sliding rails 14 are simultaneously achieved. Moreover, the tipping-up of the seat cushion portion 4 makes it possible to slide whole of the seat forward in a large distance.

Although the invention has been described above by reference to certain embodiments of the invention, the invention is not limited to the embodiments described above. Modifications and variations of the embodiments described above will occur to those skilled in the art, in light of the above teachings.

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INDUSTRIAL APPLICABILITY

~~A seat for a vehicle, in which a shift of the lever alone enables tipping up the seat cushion, reclining the seatback and sliding the seat, is provided. The seat can be slid in a large distance because the seat cushion moves accompanying with tipping up thereof. Such a movement as well as reclining the seatback make it easy for an occupant to move within the vehicle.~~

ABSTRACT

A seat for a vehicle is provided with a sliding device including a slide-lock mechanism, the sliding device sliding a seat body in a case of releasing the slide-lock mechanism, a seatback including a reclining device, the seatback being tilted forward in a case of releasing the reclining device, a seat cushion including a tip-up device, the seat cushion being tipped up in a case of operating the tip-up device and a walk-in mechanism including a lever, the walk-in mechanism configured to release the slide-lock mechanism, release the reclining device and operate the tip-up device in proportion to a shifting length of the lever. The tip-up device is operated in a case where the lever is shifted in an intermediate position and the slide-lock mechanism and the reclining device are released in a case where the lever is shifted in an end position.